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Manáos. Igarapé Marapatá. July 31, 1948.

4/ix/1947 Manáos

To-day was hectic. The launch was scheduled to leave for the Rio Negro at 6 PM but there were still so many things to try to do that I awoke very early, did some packing, ate a very early breakfast and was out as soon as the shops were open at 7:30. Luck was with me, for I was able to purchase 20 films, which are badly needed, as those from Washington did not arrive. Murca and I went at noon, out to the Estrada Aleixo to see Vochysia faberensis which we did locate but which was neither in flower nor in fruit. The locality is on a side road off Km. 7 of Aleixo, and there are many trees of Hevea guianensis, Cunuria, Micrandra and Vochysia all growing together in a white-sand forest along a brooklet. When we returned, Padre Mc Cormack, the American priest, telephoned me that there was a wire about the thousand dollar advance of funds which I requested the office to send. The Embassy in Rio de

Rio Madeira, Rosarinha, near mouth Aug 4,
> 10270 Hevea Spruceana Low tree slightly swollen at base where diameter is about 13 in. Bark dirty brown, thin, hard, smooth, Latex watery, white, not coagulating well between fingers. Leaflets very strongly reclinate, dark green, lustrous above. Flowers purplish brown.
> 10271 Hevea brasiliensis, Cult. Flowers all yellow, very pungent-aromatic. Tall tree 70 ft, leafy crown; basally swollen (due to tapping), bark hard, light grey outside, tan inside, relatively thick. Leaflets subconcolorous, reclinate. Latex thick, cream-coloured.
Rio Madeira. São Paulo near Porto Velho Aug 5, 1948.
> 10272 Hevea brasiliensis Cult. Old tree 85 ft tall, basally 2 ft. diameter (where swollen). Leaflets concolorous, reclinate. Latex white, thick. Flowers yellow. Bark smooth, grey outside, tan within, thick.
> 10273 Hevea brasiliensis Cult. Tree 70 ft. tall, diameter at swollen base about 8 inches. Bark smooth, hard, grey-brown outside, tan inside, thick. Latex white, thick. Leaflets reclinate, concolorous. Flowers very yellow.
> 10274 Hevea brasiliensis Cult. About 50 ft. tall, heavy crown. Swollen trunk diameter 2 1/2 inches. Leaflets reclinate; flowers yellow, aromatic. Latex white, thick. Bark smooth, grey outside, tan inside, soft, thick.
Rio Madeira Arandaçuara opposite Vista Alegre Aug. 5.
> 10275 Hevea brasiliensis Cult. Old tree 75 ft. tall, heavy crown. Basal diameter 27 inches; swollen due to tapping. Leaflets reclinate, very dis-colorous, above dark, lustrous green. Flowers yellow. Bark thin, hard, smooth, externally grey, internally tan. Latex thick, white.
> 10276 Hevea Brasiliensis Cult. 50 ft. tall, swollen, diameter 20 in. Flowers yellow. Latex white. Leaflets reclinate. Bark grey outside, tan inside, thick, soft, smooth.

Janeiro had wired the Consular Agent (there is none) in Manáos authorizing payment. So I had to make out a power of attorney for Murca to cash the order when it arrives through the bank here.

Murca will await the repair of the small launch of the Instituto Agronomico and will come upstream later to join me. I have decided to go up to Santa Isabel on the Higson & Co. motor launch "João" which is said to be a good craft. I am taking the food and all supplies except gasoline. My aluminium canoe and the other outfit and all supplies which are on the way from Belem are due to arrive in Manáos on the 7th.

At 8 PM, I went down to the "João". It left at 9:10. The Colombian Consul, Herrán Medina, came down to see me off. He has been so very helpful during my stay in Manáos that I do not know how I can ever repay him. At about 2:30 AM, off the Costa Santo Antonio, a terrific thunder- and wind-storm arose. The "João" has two larch barges on either side. The river became so rough that

Rio Madeira Santa Maria Urua Aug 6, 1948

10277 Hevea Spruceana X brasiliensis ? Flowers mostly yellow but with red on inside base, very fragrant. Cult for rubber! On high land, not swollen. Tree 40 ft tall, good crown, diameter about 14 inches. Bark smooth, thin, dirty brown outside, tan inside. Leaflets reclinate, dark lustrous green above, dull beneath, rather charteceous. Latex white, rather thick, coagulating to form weak rubber.

10278 H. brasiliensis Cult. Basally swollen tree 65 ft tall, diameter 2 ft. Bark internally greyish, internally tan; smooth, thick, soft. Latex thick, white, coagulating to give excellent rubber. Leaflets subconcolorous, lustrous above, reclinate. Flowers yellow, very fragrant.

10279 H. brasiliensis Cult. Tree 65 ft. tall, crown extensive, swollen base 22 in. diameter. Bark grey outside, tan inside, smooth, hard, thick. Latex thick, yellow, abundant. Leaflets reclinate, nearly concolorous, very glossy above. Flowers yellow.

10280 H. brasiliensis Cult. Flowers yellow. Leaflets reclinate, subconcolorous. Latex thick, white. Bark grey inside outside, tan inside, 3/4 cm. thick, soft. Swollen based tree 70 ft tall, diameter 29 inches.

10281 H. brasiliensis Cult. Flowers yellow. Leaflets reclinate, nearly concolorous. Latex thick, white. Bark outside greenish brown, inside tan, smooth. Columnar tree 60 ft tall, diameter 20 inches.

Rio Madeira, Coral Urua Aug 7, 1948.

10282 H. brasiliensis Cult.

10283 H. brasiliensis Cult.

we feared damage to the side of the stout ply built launch, with all the rubbing and bumping. As it was, several of the thick piassaba fibre ropes binding the barge broke, meaning more thumping and rubbing. Finally, after buffeting for nearly 3/4 of an hour, we turned into a paraná and waited until it past. But there was no more sleep in our hammocks slung every which-way across the decks. All the passengers had to continue discussing the adventure, and finally the conversation imperceptibly changed to other things but did not die down. This, combined with the hungry mosquitos which bite right through the hammocks, made the rest of the night a delightful one.

5/ix/1947

An uneventful day passed on board. The launch is making good speed. We made one stop to unload firewood, and then in the late evening, just at dusk, a second. The second stop yielded me 2 collections of cultivated *Hevea brasiliensis* and one of *H. Spruceana*. Food is excellent on board and, except for the lack of a table for writing, things are

10284 H. brasiliensis Cult. Tree, 40 ft. tall, basally swollen; diameter about 20 inches. Bark hard, thin, smooth, externally gray, internally tan; latex thick, white. Leaflets reclinate, subconcolorous. Flowers yellow, aromatic.

Rio Madeira, Boca Cajamâ Aug. 8, 1948

10285 H. brasiliensis. Cult. Columnar tree 75 ft. tall, diameter 2 ft. Bark 3/4 cm. thick, soft, smooth, outside grayish brown, inside yellowish tan. Flowers yellow, fragrant. Leaflets reclinate, nearly concolorous, glossy above. Latex very thin, white, of good rubber.

10286 H. brasiliensis Cult. Columnar tree 60 ft. tall, diameter 16 inches. Leaflets strongly reclinate, discolorous, glossy above. Flowers yellow. Latex cream-yellow, thick. Bark thin, hard, gray outside, tan inside, smooth. Crown heavy.

10287 H. brasiliensis. Cult. Basally swollen tree 40 ft. tall, diameter 18 inches. Leaflets nearly horizontal. Flowers yellow, fragrant. Latex thick, white. Bark outside gray, inside tan, hard, thick.

10288 H. brasiliensis Cult. Flowers yellow, aromatic. Leaflets reclinate, discolorous, glossy above. Bark gray outside, tan inside, soft, thick, smooth. Latex thick, white. ~~Bark outside gray,~~ inner tan, soft. Tree tall, swollen near base; diameter 2 ft. Crown large.

10289 H. brasiliensis Cult

10290 H. brasiliensis Cult

10291 H. Spruceana Cult. Flowers red within, yellowish pink outside, tips (x brasiliensis ?) Tree 40 ft. tall with swollen trunk, diameter 18-20 inches. Bark smooth, dirty brown, thin, brittle. Latex thin, white. Leaflets thick, reclinate.

Rio Madeira, Brazil (Upper course) (Mar. 1 to May 1, 1924)

10292 H. Tree. Fruit. Young tree, 35 ft. Fruit

> globular, 2 in. diam., yellow. Rind thick, firm, pungent outside, thin inside, finely cellular, orange, dark green, reticulate. Flesh strongly fragrant, yellow. Juicy, very acid, dark, thick, cream-colored.

Rio Mamoré Valley, Bolivia (Aug. 9, 1924)

10293 Tree. Fruit

10294 H. Tree. Flowers fragrant, yellow. Leaves small,

> thick, dark green, persistent, thin, finely toothed, reticulate. Tree 75 ft. tall, broadly rounded; thin, light-colored bark.

10295 H. Flowers very pale yellow, fragrant. Leaves

> 2 in. Tree 60 ft. tall, open crown. Fruit (cultivated) 2 in. diam., globular, white. Rind thick, firm, pitted, tough inside, corky. Flesh juicy, acidy, fragrant, rich, dark green above.

10296 H. Tree. Bark. Tree 65 ft. tall, broadly rounded to 40

> ft. diam. Bark light-colored, reticulate, light and white. Flesh dark-colored, acid. Flowers very fragrant.

Rio Madeira, Brazil (Upper course) (Aug. 12, 1924)

10297 H. Tree. Fruit (and

> seeds) [illegible]

10298 H. Flowers. Flowers all scarlet.

>

10299 H. Tree. Flowers [illegible] with

> [illegible]

10300 W. [illegible] Lower portion [illegible] red, yellow, green flowers all [illegible]

10301 W. [illegible] Upper portion [illegible] Sept. 10, 1945

10302 W. [illegible] Sept. 12, 1945

10303 W. [illegible] Sept. 12, 1945

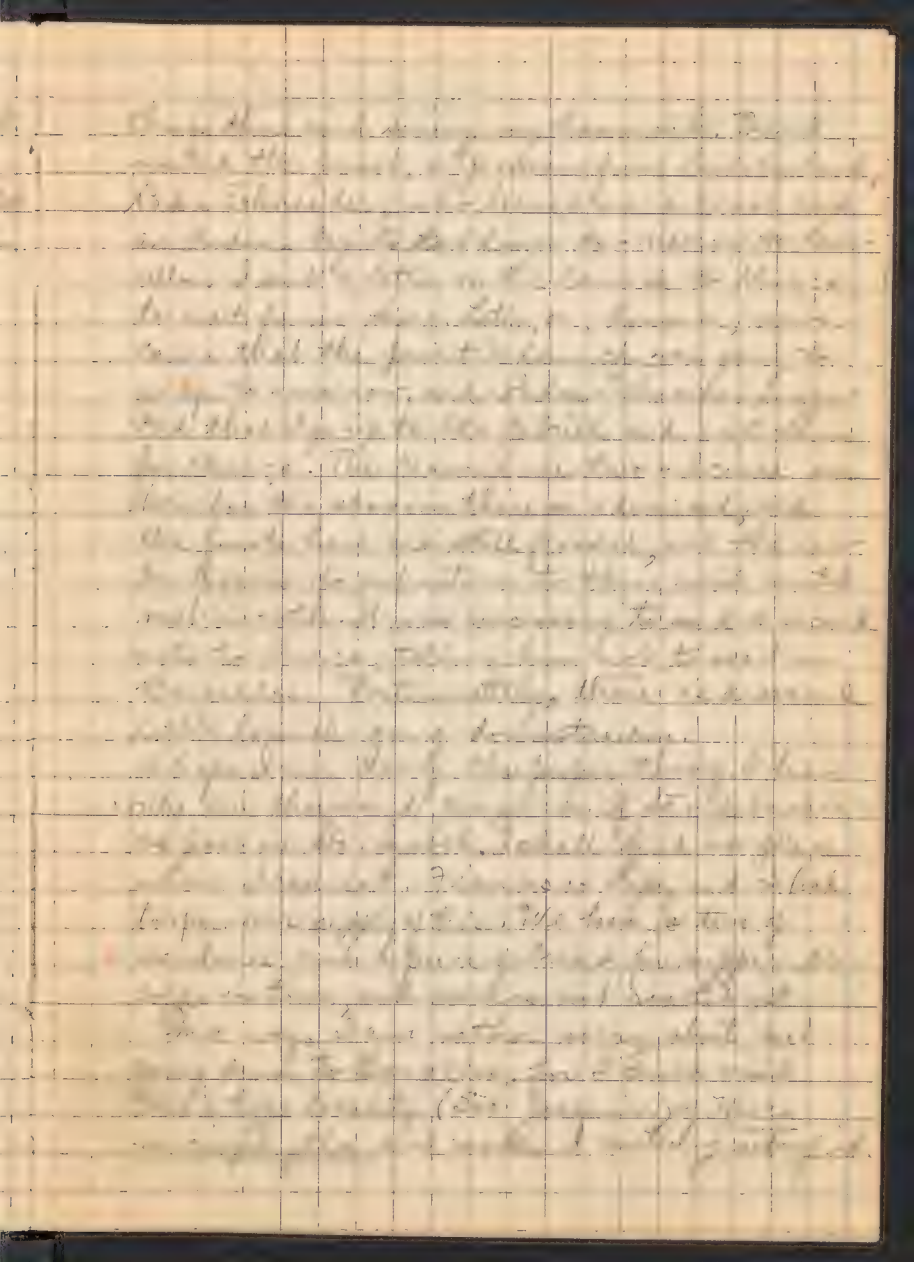
10304 W. [illegible] Sept. 12, 1945

10305 W. [illegible] Sept. 12, 1945

Aug. 14, 1945.

Aug. 17, 1945.

Aug. 17, 1945.



12/12/47

Corona of utiki

25/ix/47

A trip across the [illegible] to the northern [illegible] [illegible] of *Hevea* [illegible] [illegible] [illegible] [illegible] [illegible] along the little creek [illegible] [illegible] and [illegible] [illegible] above [illegible], [illegible] and *Hevea* [illegible]. Only several plants [illegible] found in flower.

26/ix/47

[illegible] has [illegible] me [illegible] [illegible] with a long [illegible]. [illegible] cloth [illegible] [illegible] to [illegible] to [illegible] [illegible]. On the way [illegible] *[illegible]* and *Hevea* [illegible] additional [illegible]. [illegible] from [illegible] will [illegible] as far as [illegible] home [illegible]. [illegible] a relief to get [illegible] again with the hope of new material. The [illegible], offering [illegible] [illegible] the trip. [illegible] [illegible] [illegible] all night.

27/ix/47

We awoke [illegible] a most magnificent [illegible] above [illegible], we stopt, made breakfast, and [illegible]. We also collected [illegible] [illegible]

with a small sized type of [illegible] Bt., but especially Cuneria, are extremely abundant here. The night was wonderfully clear and the tide did not drive us out.

28/ix/47

About 3 this afternoon, I came down [illegible] [illegible] Col. [illegible] at the [illegible] [illegible] in the morning [illegible] [illegible] [illegible].

29–30/ix/47

I had [illegible] [illegible] [illegible] with [illegible] of quinine. [illegible] not malaria.

1/x/47

At noon, [illegible] Santa [illegible] the launch [illegible] [illegible] launch [illegible] [illegible]. In the evening [illegible]

5/x/47

6/x/47

7/x/47

letter is of no interest, but we had a chance to see and hear a few [illegible] above. We continued upstream [illegible] to a nice place, below [illegible]

5/X/97 [illegible]

Finally we are in Santa Isabel [illegible] at noon. It began to rain [illegible] in that the people [illegible] on board and San Isabel [illegible] this long delay.

9/X/97 Santa Isabel

I spent the morning collecting plants on the island opposite to the hotel and the afternoon [illegible] the [illegible] of drying the specimens. The result of the collecting [illegible] of the results [illegible] at 5:30 P.M. [illegible] hours after something happened to the motor. We refused to go and all efforts to make it work were in vain. During the night [illegible] to repair it. This trip [illegible] disappointments after another and I am wondering if I shall ever see Horas [illegible] Isle [illegible] I am doing with a very bad cold.

10/x/47

11/x/47

12/x/47

[illegible]

13/X/'17 [illegible]

[illegible] Although [illegible] Today, [illegible] There [illegible] tired.

14/X/'17

Early [illegible] took the [illegible] had already [illegible] arriving at [illegible] PM.

15/X/47 São Gabriel

[illegible] 21 [illegible] 23 [illegible]

[illegible] the [illegible]

16/X/47 São Gabriel

While I [illegible], Mucao and a local mechanic [illegible] looking over the motor I [illegible]. Nearly all my collections for the last month and a half are rotten! [illegible] I bought [illegible], these [illegible] were tightly [illegible] in rubber bags. There is no reason why these should [illegible] at least 2 months without rotting. Another cause of [illegible] [illegible] cartons and blotters and [illegible] my rations. When [illegible] at [illegible] he gave these things to Frões, [illegible] launch, [illegible] up to [illegible] at Santa Isabel. [illegible] bought

that Dr. Sanjiva was kind enough to ask the vice-Principal of Fergusson College, Dr. Patwardhan to see Dr. Ghatage. They were very kind. No doubt all of them. Fazal stopped off at the Fergusson gate and he appeared a bit more mistaken for a pair of three wheelers. Now, without the rattle, I shall find working on the motor-bike much more difficult because of digging up fuse and pens, and we need the bike very much, indeed, nearly without an ample supply of petrol. To-day, I sent for a ration for his birthday to-morrow. Fortunately, the Sao Gabriel Padaria has been paid.

17/x/47

Continuing to dry. Rioco [illegible] plants [illegible] with the rest rotten, I am having many set backs. The house [illegible] with the Institute and are waiting ok. Now has a very good cook and has to be provided with a stove! The machinist is bedding with the motor and promises to have it ready "soon".

18/x/47

Finally, the machinist has pronounced the motor "cured", after welding various broken pieces. He also broke the [illegible] plug, and

unusual sight not to be explored as usual in the morning, so we are leaving with a favourable wind, plus! The river here Sir Gabriel assures us, is deep and even with the 5½ HP outboard to help the 5 HP inboard it is still wise all we could do to pass. Also the outboard floods when the barometer falls, so we refused to work. Then we had to leave with the aid of ropes. The gauges were very slow.

19/X/47

Then one morning, we arrived at the mouth of the Flores river, the mouth of the Usumacinta. Just a little way up the river is the town of Frontera, where Cortez is supposed to have landed, but we did not go ashore, as we wanted to get on to Villahermosa, which is some hundred miles up the river. Once on the river, I had to keep a sharp look out with lake and river charts, as there are many shoals and sandbanks. The river is very high and wide with a fast current, and the banks are covered with dense jungle. Here and there are cattle ranches, and we saw a few canoes and fishermen.

19/X/47

Stopped in the Rio Grijalva and anchored near the motor launch of the Mexican Petroleum Co. Here I met Mr. Lawrence and Mr. Sutton, directors of Petroleos Mexicanos, and their wives and children. Mr. Lawrence is a Welshman and his father was a miner.

1 26/x/47

Mr Jones and an associate from Mexico ... [illegible] ... Dr Campbell departed for Mexico City ... [illegible] ... with the boys, visiting the ruins along the banks, leaving Mitla for the week-end, and we came down to Oaxaca, where I left for the valley ...

27/x/47

Spent in transit ...

28-29/x/47

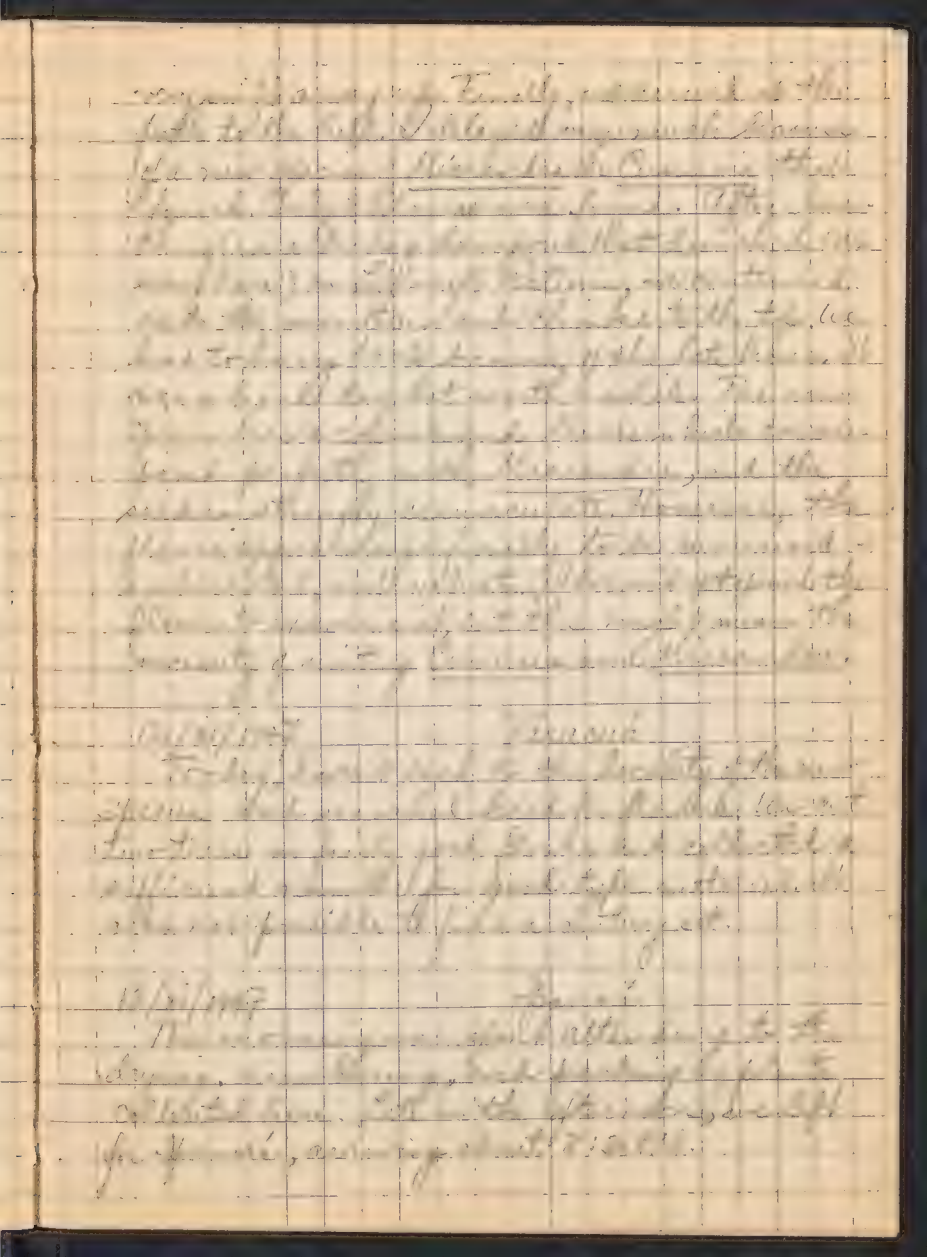
Two days in Oaxaca, but was sorry at having left Mitla, [illegible] ...

30-31/x/47

Spent a couple of days in Oaxaca, and transmitted my ... [illegible] ... from the ... [illegible] ... Oaxaca ...

1/xi/47

... [illegible] ... to Mitla to find [illegible] ... I ... [illegible] ... Mitla ... [illegible] ... Oaxaca ... [illegible] ... (with Hans [illegible]), ... [illegible] ... 14:30 PM, ... [illegible] ...



10/21/1942

Record

29/xi—3/xii/37

9/xii/1947.

[illegible] At present, [illegible] available. There is [illegible] [illegible] side, but [illegible]
[illegible]
[illegible] country, [illegible]
[illegible]
[illegible]
[illegible] At [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible] The [illegible]
[illegible]
[illegible]
[illegible]. But [illegible], [illegible]
a [illegible] 5 [illegible] (col. 2.50) and all [illegible]
— [illegible] dear? [illegible]
[illegible]
[illegible]
[illegible] (one [illegible]
[illegible] the clothes are sent to the washer-
[illegible]).

There are two Italian Salesian priests here, [illegible]. Both [illegible] a [illegible] [illegible] shack which [illegible], and di-

The Manaos Museum, an offshoot of the Museu Goeldi [illegible] Museum, at Belem, [illegible] 1917. [illegible] Museum [illegible] Belem, May, 1923, while [illegible] the great Amazonian River [illegible] and pursuing taxonomic studies in Hevea, I found, on the tops of isolated granite hills of outcrossing age, a curious assemblage of Hevea nitida. Due to its often prostrate and rambling habit (owing insufficient soil caused its roots to take [illegible] in cracks in the rock), it resembled to an astonishing degree, with its leaf, flower, drupe, seed, [illegible] Hevea brasiliensis; for this reason, the specific epithet brasiliensis was given to it.

Since the genus Hevea (Para-rubber) includes some of the Amazon's largest trees and since rare species dwell in swamps or periodically flooded river banks - and always in forests -, the discovery of a diminutive representative, very contrarily, in open savanna on sun-baked, xerophytic stone [illegible] was a cause of intense surprise to me.

This variety was not the first diminutive representative of Hevea to be reported from the "great rock", however. In 19 - Dr. Adolpho Ducke had described Hevea camporum upon a fruiting specimen brought to him from the "campos" or open plateau between the heads of the Uaranaccu and the Mamoré rivers by the late Pedro Monteiro da Costa.

My curiosity was immediately aroused and the apparent parallelism between H. camporum and H. nitida was, to a student of evolution, a parallelism due probably to similarity in ecological factors and not to any close relationship - goaded me with an intense desire to become acquainted with Hevea camporum in its native habitat. The agent Jungle reduction work on Hevea in Amazonia, however, made it impossible to think of a trip to Brazil for

more than two years. During and after this interim, the need for field studies of *Hevea camporum* was kept in mind as doubt as to its validity as a species was expressed both by Ducke and by Dr. John T. Baldwin who, in 1943-44, had conducted a cytogenetic survey of *Hevea* over a wide area of the Amazon. Both of these investigators intimated that *Hevea camporum* might possibly represent a variant of *H. brasiliensis* var. *scricea*.

Early in 1945, Dr. Felisberto Camargo, Director of the Instituto Agronômico do Norte in Belém, invited me to join his staff in Brazil in collaboration with the very active institution which he headed. I found it possible to go to Brazil for a short four months in 1945, and, naturally, the first expedition which I desired to carry out was to the type locality of *Hevea camporum*.

Dr. Camargo agreed to the advisability of this trip and placed at my disposal the facilities of the Institute. It was decided to attempt the trip at the beginning of the dry season for two reasons: first and most important — this is the time that most species of *Hevea* flower, and the flowers of *H. camporum* were unknown; secondly — the Mamoliére Rapids, according to available reports, often flood out too much for navigation, even by canoe, late in the dry season which, in the upper Madeira region, unusual for the Amazon, often has several months without even one rain-storm.

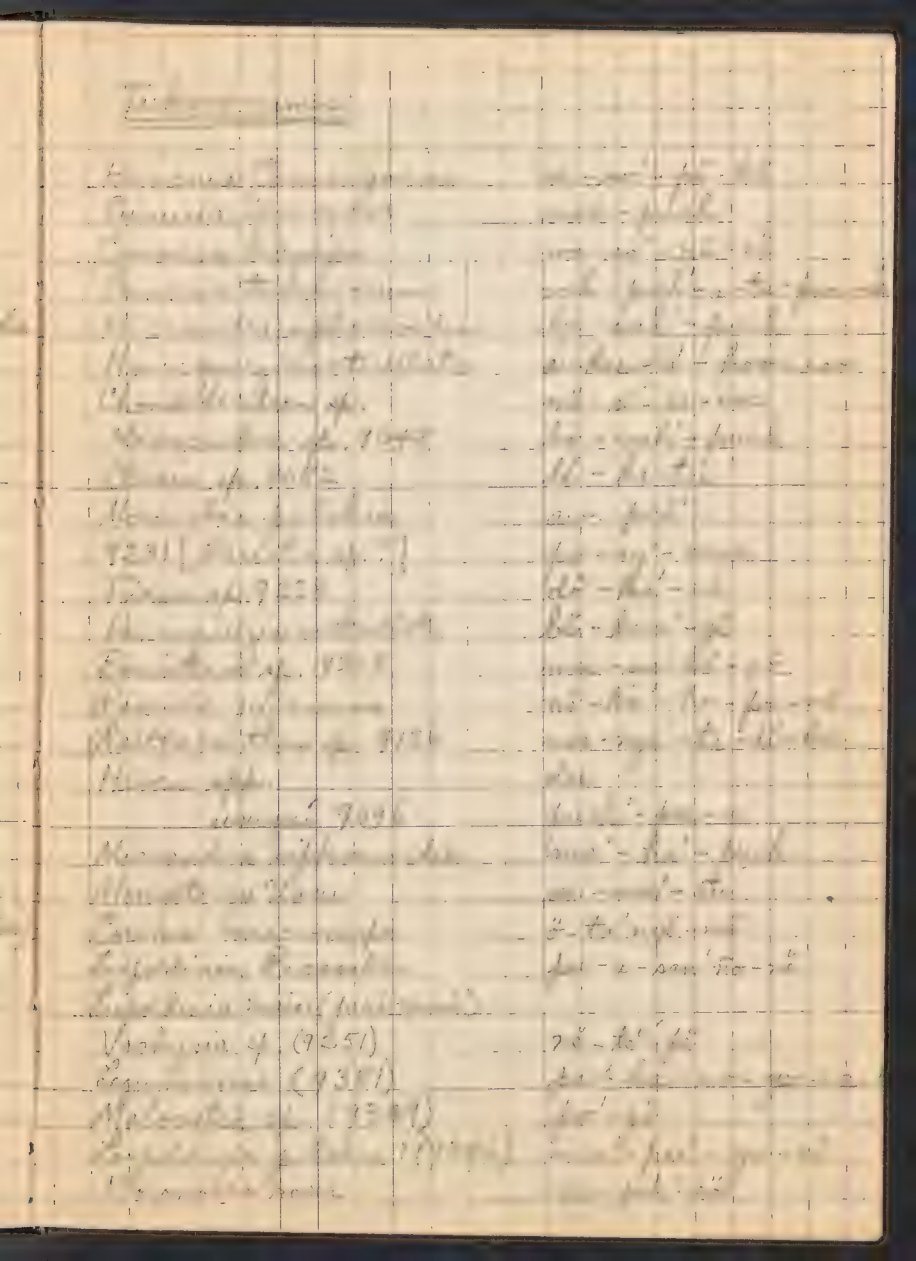
Guards, accordingly, were dedicated to this purpose. Agronomist Edgar Cordeiro, director of the sub-station at Porto Velho of the Instituto Agronômico do Norte, accompanied me. For with a small 5 H.P. motor launch, property of the Institute. A small wooden rowboat and a 22 H.P. outboard-motor boat were taken to use in the event that the launch could not pass the rapids indicated on the maps of the Mamoliére. Several days were spent going up river in the launch, often with

considerable difficulty due to extremely low water. At the first (Government) rapids (which we reached the — of August), it was necessary to leave the launch and continue in the small boat. After passing the next rapids upstream, however, it was at once evident that there was not enough water even for this and the 20 h.p. outboard-motor, for the last half-day upstream was spent walking along the bed of the rain-infested river pulling the Boat. A glance at the map told me how little chance we had of arriving at the headwaters where Hevea caoutchouc occurs. On the advice of a local guide, who knew the river well, Cardoso and I easily decided to turn back, resolving later to make the trip during the rainy season even though flowers would not then be available.

Three years passed during which urgent jungle collection work and taxonomic field studies in Colombia and the upper Negro River of Brazil again provided the postponed return to the Marmellos. In the meantime, the war came to an end and with the result that many articles essential to the efficient and further collection (unavailable for) were beginning to appear. One of these articles was a type of light canoe conveniently made of duralumin. Principally for work in the rapids-ridden upper Negro River but thinking also of the Marmellos, I purchased one of these 18 ft, 50 kg canoes in 1947 and took it to Rio de Janeiro [illegible]

Cucurbita

1 ♂ sepala valde imbricata
2 ♂ discus nullus
3 stamina decem
4 stamina sine pistillo
5 flos ♂ pistillo saepe (non semper ?)
6 ♀ sepala non reducta
7 ♀ discus cupuliformis, glandulosus - lobatus, vel
8 stylo ovo adnatus, saepe] nullus
9 ovarium spinis saepe tectum
10 semina exalbuminata



mamão (Carica Papaya)
cocos (Cocos nucifera)

Aug. 13 (Fri) Left launch and cont. in canoe with outboard motor. Below Sepoty to pt. above Sepoty 8:00 AM 5:00 PM (8 hrs)

Aug. 14 Sat. upstream 7:00 AM – 5:10 PM (8 hrs)

Aug. 15 (Sun) upstream 6:30 AM – 5:30 PM (9½ hrs) to Palmeira

Aug 16 (Mon) Upstream 5:45 AM – 6:15 AM Passing rapids 6:15 – 4:45 PM to pt. above mad. Branco (7½ hrs)

Aug. 17 (Tues) Upstream 7:00 AM – 5:15 PM (7¾ hrs) to pt below Rio Preto

Aug. 18 (Wed) 5:30 AM – 4:30 PM (6 hrs.) Upstream

Aug. 19 (Thurs) Upstream motor + poling 7:00 AM – 4:30 PM

Aug. 20 (Fri) Downstream paddling 8:00 AM – 10:30 PM

Aug. 21 (Sat.) Downstream motor + paddling 5:30 AM – 5:30 PM to Panicá

Aug 22 (Sun) Downstream motor Panicá to unknown pt 12:15 AM – 5:3 PM

Aug 23 (Mon) ~~Downstream motor~~ Downstream 12:45 PM – 12:00 midnight ~~Downstream motor~~ 12:01 AM – 11:45 PM Downstream paddling 11:45 AM – 12:00 midnight to launch

Aug. 24 (Tues) Downstream paddling to launch (mouth Maicy) 12:01 AM – 3:35 AM

Launch downstream Manaus – Madeira to Manicoré 4:20 AM – 7:30 PM

Aug 25 (Wed) Manicoré downstream 12:15 PM – 7:00 PM Launch

Aug 26 Downstream 7:00 AM —